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(The following article was taken from a book titled *The Spirit of Enterprise*, a collection of applications to The Rolex Awards for Enterprise 1981, an international personal enterprise." Patrick Cudmore and his family live at High Pines.)

## World's Fastest Sailboat

By PATRICK CUDMORE

I intend to build a 1 or 2 man hydrofoil sailboat that will be the fastest sailboat in the world. This sailboat will be manufactured easily and inexpensively, making it the world's first commercially produced hydrofoil sailboat. It will be practical, easy to sail, and will make the experiences of speed and flight in the water accessible to all.

To fly. To go beyond existing limits. To be in harmony with the basic forces of nature. These are desires, perhaps even drives, punctuating again and again the history of human endeavor. My practical hydrofoil sailboat will not only break the existing world speed record for sail but will also partially satisfy these 3 aspirations.

The dream of flight has been with us from the time of the earliest recorded civilizations. It permeates our myths and fantasies. It could be a recognition of a longing to become again, as we once were, contiguous with nature - with it and of it, not against it.

Our dream, to a large extent, has been realized. We have learned to fly. The evolution of human flight, through air and through water, has followed the same pattern. We mastered aerial flight initially through discovery of buoyant lift, where the pressure of the medium provides the supporting lift. Then dirigibles and hot-air balloons gave way to aircraft whose wings created dynamic lift. The motion through the medium developed the pressure that lifted the craft.

assumptions. It is faster than most conventional sailboats and imparts a unique and exhilarating sensation of true flight. However, this version is not competitive in its low-speed performance. The prototype I wish to build is a modification of the original hull design that will significantly improve both low- and high-speed performance. It is coupled with a breakthrough invention in sail technology, to create not only the world's fastest sailboat, but also a prototype for the world's first commercially feasible hydrofoil sailboat.

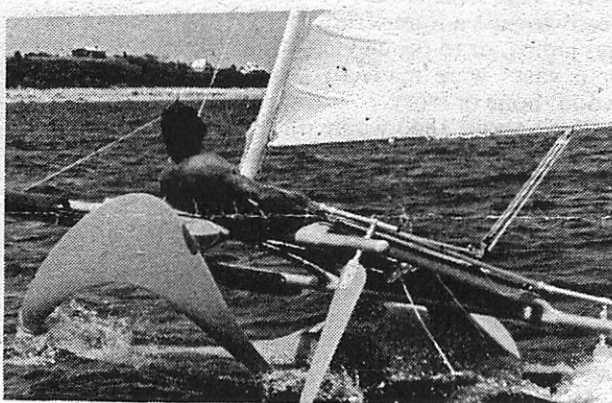
This is not an esoteric, experimental design with performance as its only criterion. I have imposed another constraint. I wanted a design that could be mass-produced easily and inexpensively, making the dramatic sensations of flight, speed, and unity with natural forces available to the average person.

Since the sail design is not yet protected, I am withholding it at this time. I can say, however, that it is a sailing employing the superior lift capabilities of the Liebeck Airfoil. The same principles were used in the airfoils of the "Gossamer Condor" and "Gossamer Albatross," winners of the Kremer Prizes for human-powered aircraft. If necessary, I will submit my design to the Selection Committee.

Only the final step of this project is incomplete. I have already done a detailed hydrodynamic and aerodynamic analysis of the design. I have shaped the wooden plug from which the mold for the fiberglass modules will be made. Only the actual construction remains to be done - fabricating the hull and making the Liebeck sailing. My ideas have been proven in prototype and theory; the design is complete. All I need is the money to build it.

The theoretical and mathematical analysis shows that this prototype will be a tremendous advance over current hydrofoil sailboat design for the following reason:

1. Easier Control. This prototype replaces the classic rudder with a new and simpler control system.



In water, the evolution from buoyant to dynamic lift, has been around since the late nineteenth century, but so far it has not fulfilled its original promise of faster and more efficient boats. Witness the fact that the current holder of the world's sail speed record is merely a modified conventional hull, employing only buoyant lift. The fastest hydrofoil boats are 30 percent slower.

Hydrofoil boats, in general, have merely added the elements of dynamic lift (hydrofoils) onto the element of buoyant lift (conventional hulls). I have invented the first sailboat that successfully integrates the dynamic and buoyant lift components into a single hull structure.

I have constructed a preliminary version of my design. This boat, in testing, verified my basic design

sailed up to 100 percent faster than current hydrofoils and conventional sailboats.

3. Wider "Flight" Range. It will lift out ("fly") at a boat speed of  $3\frac{1}{2}$  knots. Current hydrofoil sailboats require speeds 3 to 4 times that in order to "fly." Thus, this design will provide far more opportunities to "fly" in light wind conditions.

4. High-Speed Safety. The hydrofoils on this prototype cannot ventilate and lose lift at high speed. "Ventilation" (air entrainment) plagues all current hydrofoil sailboats and often precipitates capsizing under high speed.

5. Simplicity and Unity of Design. The boat is beautiful as well as being commercially viable.

My hydrofoil's total performance, therefore, will be truly exceptional. It will attain a speed 1.5 times to 2.5 times that of true wind speed, while even the fastest conventional sailboats rarely exceed 1.5 times true wind speed. It will surpass the current world speed record for sail of 34 knots, in wind speeds of just 13-21 knots. This is no more than a moderate to fresh breeze.

With this design, the experience of surpassing the existing world speed record will not be limited to a single expert sailor in an intricate and temperamental craft. It can be shared by millions of people. Yet this is not its only benefit. We are in danger of destroying our planet because we do not fully comprehend our relationship to the rest of the natural world. This hydrofoil can teach a vivid lesson: we do not have to subdue and conquer natural forces to use and control them. We can have safe access to their awesome energies. A person can cruise with this hydrofoil at power boat speeds, using only wind and water. In fact, this hydrofoil's greatest contribution may be symbolic and intangible -- a recognition that we are one with the world we inhabit and that, in harming it, we must thereby harm ourselves.

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